

Table S1. Distribution of RNAi patents related to SARS and MERS in the CAS content collection

Patent Number	RNAi type	Target	CAS Patent Title	Organization
US20040192626	siRNA, microRNA, shRNA	Various regions	RNA interference-mediated inhibition of gene expression using chemically modified short interfering nucleic acids	Sirna Therapeutics, Inc.
US20050020525	siRNA, microRNA, shRNA	Various regions	RNA interference-mediated inhibition of gene expression using chemically modified short interfering nucleic acids	Sirna Therapeutics, Inc.
US20070270360	siRNA, microRNA, shRNA	Various regions	RNA interference-mediated inhibition of severe acute respiratory syndrome (SARS) gene expression using short interfering nucleic acid	Sirna Therapeutics, Inc.
WO2004092383	siRNA, microRNA, shRNA	Various regions	RNA interference-mediated inhibition of severe acute respiratory syndrome virus gene expression using siRNA	Sirna Therapeutics, Inc.
CN1721530	siRNA, dsRNA	Replicase (Pol) region	SiRNA for inhibiting target gene expression and uses in treating tumors and viral infections	Yang Huaxian
US8653252	siRNA	Replicase (Pol) region	Short interfering rna (sirna) analogues	Santaris Pharma A/S
CN101085986	siRNA	ORF3a	Sequences of siRNAs for treatment of SARS coronavirus	Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences
CN101113158	siRNA	RdRp	SiRNA capable of inhibiting gene RdRp of SARS virus	Sichuan University
CN101173275	siRNA	M gene	Application of siRNA for inhibiting expression of SARS coronavirus M protein	Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences
CN101182517	siRNA	Spike, nsp-9, nsp10, nsp13	Sequence and application of multi-target double-stranded siRNA cocktail for disease treatment	Guangzhou Top Genomics, Ltd.
CN102453712	siRNA	PI4KB	Inhibition of SARS coronavirus infection using siRNA molecules	Institute of Basic Medical Sciences, Chinese Academy of Medical Sciences

CN1458281	siRNA	RdRp Spike protein M protein Packaging protein	Preparation of small interfering RNA and use for SARS coronavirus diagnosis and therapy	Huanqiu Zhongjia Biotechnology Co., Ltd.
CN1465584	siRNA	Various regions	Construction of siRNA target sequence library of SARS virus and its application in designing and screening antiviral agents	Beijing Jiaotong University
CN1548054	siRNA	RdRp	Sequences of siRNAs for preventing and treating SARS coronavirus	Hou Weimin
CN1569233	siRNA	RdRp, helicase, nucleoprotein N, proteolytic enzyme gene	Manufacture of siRNA for SARS gene therapy	Yin Dongsheng
CN1569878	siRNA	Various regions; Target sequence in patent	Pharmaceutical uses of small interfering RNA (siRNA) sequence specific for SARS coronavirus	Beijing Gsets Antisense Technology Development Co. Ltd.
CN1590545	siRNA	RdRp Spike protein	Small interfering rna (siRNA) against mRNA of SARS coronavirus and its application	Hangzhou New Rayjay Biomed Corporation
CN1609116	siRNA	Replicase Polymerase Guide region	Small interfering RNA (siRNA) against SARS coronavirus	Tsinghua University; Institute for Viral Disease Control and Prevention, Chinese Cemter for Disease Control and Prevention
CN1609117	siRNA	Replicase Polymerase Guide region	Small interfering RNA (siRNA) against SARS coronavirus	Tsinghua University; Institute for Viral Disease Control and Prevention, Chinese Cemter for Disease Control and Prevention
CN1648249	siRNA	M,N,E gene	Small interfering RNA (siRNA) for inhibiting SARS coronavirus gene expression	Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences

EP1482037	siRNA	Replicase (Pol) region	Inhibition of gene expression by delivery of specially selected double stranded or other forms of small interfering RNA precursors enabling the formation of small interfering RNA in vivo and in vitro	Yeung Wah Hin Alex
JP2006238724	siRNA	Various regions	Method and apparatus for designing siRNA combination for HIV-1	National Institute Infectious Diseases, Japan; Tokyo University; Alphagen K. K.
JP2008253188	siRNA	DNaseX	Control methods of endocytosis dependent DNA incorporation by regulating the DNaseX gene and application to the regulation of viral infection	Tokyo University of Science, Japan; Immuno-Biological Laboratories Co., Ltd.
US20050004063	siRNA	Replicase A1 S,N,M,E gene	Inhibition of SARS-associated coronavirus (SCoV) infection and replicatipon by RNA interference	The University of Hongkong
WO2005019410	siRNA	Nsp-1, Nsp-9 and spike gene	SiRNA targeting SARS nsp-1, nsp-9 or spike gene for anti-SARS coronavirus therapy	Intradigm Corporation
WO2017044507	siRNA	PL ^{pro} RdRp Spike protein	SiRNA/nanoparticle formulations for treatment of middle-east respiratory syndrome coronavirus infection	Sirnaomics, Inc.
EP1647595	shRNA	Various regions	Prevention and treatment of viral infections by RNA interference targeting conserved, essential regions and escape mutants	Academisch Medisch Centrum Bij De Universiteit Van Amsterdam
CN107488660	Short hairpin RNA	ORF3 25962-25983 bp of GenBank DQ497008	Palindromic and complementary palindromic small RNA and application in RNA interference	Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences; Nankai University
WO2005013905	Modified oligonucleotide	3' terminal end of negative strand	Sense antiviral oligonucleotide analogs and method for treating ssRNA viral infection	AVI BioPharma, Inc.
WO2005023083	Modified oligonucleotide	Various regions	Antisense oligonucleotides for the treatment of severe acute respiratory syndrome	Isis Pharmaceuticals, Inc.
WO2018227440	MicroRNA inhibitor	microRNA-200c-3p	Applications of mir-200c-3p microRNA in treating lung injuries	Institute of Basic Medical Sciences, Chinese
US20030224353	Antisense oligonucleotide	ORF1, for SARS region 217-245 bp	Antisense antiviral agent and method for treating ssRNA viral infection	Stein, David A

KR2009128837	RNA aptamer	dsDNA	Identification of RNA aptamers for inhibition of severe acute respiratory syndrome corona virus helicase activity	Konkuk University, Industry-Academy Cooperation Foundation
KR2012139512	RNA aptamer	nucleocapsid	Aptamer specific to severe acute respiratory syndrome coronavirus and pharmaceutical composition comprising the same	Kookmin University, Industry-Academic Cooperation Foundation
JP2007043924	Ribozyme	GUC in gene	Method for detection of DNA methylation at specific position of target gene	Hamamatsu Photonics Co., Ltd.

Table S2. Distribution of vaccine patents related to SARS and MERS in the CAS content collection

No.	Patent Number	CAS Patent Title	Organization	Priority Date
1	RU2709659	Adenoviral vectors-based immunobiological agents for inducing specific immunity Middle East respiratory syndrome coronavirus (MERS-CoV)	The Ministry of Health of the Russian Federation	20180906
2	CN109055427	Pseudotyped middle east respiratory syndrome coronavirus (MERS-CoV) infecting animal, preparation method and application thereof	National Institutes for Food and Drug Control	20180809
3	CN110616198	Preparation of coronaviral vaccine using chimpanzee adenovirus-68 and MERS-CoV full-length membrane protein and its use for treatment of Middle East respiratory syndrome	Tsinghua University; Chinese Academy of Sciences	20180619
4	KR2019119391	Full-length of MERS coronavirus nucleoprotein and vaccine composition for prevention of MERS coronavirus infection comprising the same	Korea Research Institute of Bioscience and Biotechnology	20180412
5	KR2019000009	MERS antigen protein production method using <i>Drosophila melanogaster</i> S2	University-Industry Cooperation Group of Kyunghee University; Bore Da Biotech Co., Ltd.	20170621
6	CN107058377	Application of plant as host in expressing vaccine of middle east respiratory syndrome	USA	20170616
7	CN107058377	Application of plants as host in expressing vaccines for Middle East respiratory syndrome	Shenzhen Huisheng Biotechnology Co., Ltd.	20170616
8	WO2018170347	Zoonotic disease RNA vaccines for inducing neutralizing antibodies against Lassa virus, Nipah virus and betacoronavirus	Modernatx, Inc.	20170317
9	WO2018115527	Use of mRNA-based vaccines for prophylaxis and treatment of MERS coronaviruses	CureVac AG	20161223
10	WO2018097603	Preparation of recombinant spike protein of middle east respiratory syndrome coronavirus for immunogenic vaccine compositions	SK Chemicals; SK Bioscience Co., Ltd.	20161123
11	KR2018047054	Immune adjuvant substances comprising modified lipooligosaccharides for vaccine compositions	EyeGene Inc.	20161031

12	WO2018081318	Prefusion coronavirus spike protein immunogens for vaccine application	U.S. Department of Health and Human Services; Dartmouth College; The Scripps Research Institute	20161025
13	CN106119213	Mers-cov chimeric vlps vaccine with influenza virus m1 as skeleton	Chinese Center for Disease Control and Prevention	20160620
14	WO2017184626	Cold adapted and virulence factor deleted live attenuated vaccine suitable for mucosal delivery	Emerging Viral Vaccine Limited	20160418
15	WO2017176596	Multivalent vaccines for rabies virus and coronaviruses	U.S. Department of Health and Human Services; The University of Maryland System; Thomas Jefferson University	20160404
16	CN106928326	Preparation of vaccines comprising dimeric receptor-binding domain from MERS-CoV or SARS-CoV S protein against coronavirus infection	Chinese Academy of Sciences	20151231
17	WO2017070626	Respiratory virus vaccines	ModernaTX, Inc.	20151022
18	WO2017046801	Coronavirus Spike protein receptor binding motif (RBM) epitopes-based vaccines	Ramot at Tel-Aviv University Ltd.	20150917
19	CN105169384	Recombinant ntd protein subunit vaccine against mers-cov infection	Chinese Center for Disease Control and Prevention	20150722
20	CN105543248	Recombinant adenovirus type 5 vector vaccine based on optimized MERS-CoV spike protein coding gene	Chinese Center for Disease Control and Prevention	20150313
21	CN105273067	Recombinant 41 type adenoviral vector vaccine encoding MERS-CoV spike protein	Chinese Center for Disease Control and Prevention	20150313
22	WO2016138160	Middle east respiratory syndrome coronavirus immunogens, antibodies, and their use	U.S. Department of Health and Human Services	20150224
23	EP3045181	A vaccine against the Middle East respiratory syndrome coronavirus based on MERS-CoV nucleocapsid protein or nucleic acids encoding same	Ludwig-Maximilians-Universitaet Muenchen; Philipps-Universitaet Marburg	20150119
24	EP3045181	A vaccine against the Middle East respiratory syndrome coronavirus based on MERS-CoV nucleocapsid protein or nucleic acids encoding same	Ludwig-Maximilians-Universitaet Muenchen;	20150119

			Philipps- Universitaet Marburg	
25	NL2014148	Combination vaccine for camelids	Erasmus Universiteit Rotterdam	20150116
26	NL2014148	Combination vaccine for camelids	Erasmus Universiteit Rotterdam	20150116
27	WO2018094241	Immunogenic composition for MERS coronavirus infection	New York Blood Center, Inc.	20140728
28	WO2015143335	Chimeric coronavirus spike proteins for protective vaccination	University of North Carolina	20140320
29	WO2015119291	Virus-like particle containing recombinant virus membrane protein and lipid derived from Bombyx mori for vaccine	The Institute of Biological Resources	20140210
30	WO2015081155	MERS coronavirus vaccine	University of Pennsylvania; Inovio Pharmaceuticals, Inc.	20131129
31	WO2015080973	SARS coronavirus spike protein immunogen	Baylor College of Medicine	20131126
32	CN103724406	MERS-CoV synthetic peptide vaccine with neutralizing activity and its application	Chinese Center for Disease Control and Prevention	20131120
33	WO2015057666	Methods and compositions for coronavirus diagnostics and therapeutics	University of North Carolina	20131014
34	WO2015042373	Middle East respiratory syndrome coronavirus (MERS-CoV) particulate vaccine	Novavax, Inc.	20130919
35	CN104292339	Recombinant protein containing SARS virus RBD antigen and baculovirus displaying RBD protein	Tefei (Tianjin) Biomedicine and Technology Co., Ltd.	20130718
36	CN104292338	Recombinant protein containing SARS virus N antigen and baculovirus GP64 protein signal peptide and transmembrane domain as SARS vaccine	Tefei (Tianjin) Biomedicine and Technology Co., Ltd.	20130718
37	CN104293740	Recombinant baculovirus for displaying SARS bivalent antigen at surface, and preparation method and application	Tefei (Tianjin) Biomedicine and Technology Co., Ltd.	20130718
38	CN103554235	Receptor binding domain fragment from Middle East respiratory syndrome coronavirus membrane protein	Tsinghua University	20130617

39	WO2014153087	Nanoparticle-based compositions	Massachusetts Institute of Technology; Brigham and Women's Hospital; Harvard University; Brigham and Women's Hospital	20130314
40	WO2014153087	Nanoparticle-based compositions comprising inactivated pathogen and adjuvant-loaded polymeric nanoparticles for administration to mucosal membranes	Harvard University; Massachusetts Institute of Technology; Brigham and Women's Hospital	20130314
41	US20160296617	Immunogenic composition for MERS coronavirus infection	New York Blood Center, Inc.	20130301
42	WO2014134439	Immunogenic composition for protective vaccination against MERS coronavirus infection	New York Blood Center, Inc.	20130301
43	WO2012103358	Conjugates utilizing platform technology for stimulating immune responses	University of Colorado	20110126
44	WO2011094357	Conjugates utilizing platform technology for stimulating immune response	University of Colorado	20100126
45	WO2011004146	Chimaeric protein	The Pirbright Institute; Institute for Animal Health	20090707
46	WO2011004146	Fusion products of coronavirus spike proteins with extended tissue tropism and their use in vaccine preparation	Institute for Animal Health	20090707
47	WO2010148434	Chimeric molecules comprising an antigen and foamy virus envelope protein their use for producing immune responses	The MacFarlane Burnet Institute for Medical Research and Public Health, Ltd.	20090622
48	WO2010148335	Intramolecularly crosslinked and structurally constrained viral peptide compositions and methods of their use to prevent or treat viral infections	Dana Farber Cancer Institute, Inc.	20090618
49	KR2010120473	SARS vaccine nanoparticle delivery system	Seoul National University	20090506
50	CN101575361	Novel specific polypeptides, and their application for diagnosis, prevention and treatment of coronavirus-induced SARS	Beijing Genovax Biotech Corporation; Yu, Li	20090320
51	WO2010063685	Vaccine	GlaxoSmithKline	20081202
52	WO2010063685	Vaccine comprising spike (S) protein of SARS coronavirus and an oil-in-water emulsion adjuvant	GlaxoSmithKline; Institut Pasteur	20081202

53	WO2010061919	SARS coronavirus cytotoxic T cell epitope peptides coated on surface of liposomes for inducing HLA-A2-restricted cytotoxic T lymphocytes	NOF Corp.; Saitama Medical School; Natl. Inst. Health Japan	20081128
54	WO2010011347	CLIP inhibitors and methods of modulating immune function	University of Colorado; Viral Genetics, Inc.	20080725
55	WO2009009054	Methods for generating immune response using cationic-liposome-mediated nucleic acid delivery	Georgetown University	20070709
56	WO2009085025	Vaccine for SARS coronavirus infection	GlaxoSmithKline; Institut Pasteur; Vickles, Brenda	20070619
57	WO2008155316	Vaccine comprising SARS coronavirus spike protein	GlaxoSmithKline; Institut Pasteur	20070619
58	CN101100680	Method for constructing recombinant baculovirus expressing S protein of SARS coronavirus with high efficiency	Chinese Academy of Sciences	20070615
59	WO2008121992	Attenuated viruses encoding modified viral genes useful as vaccines against viral infection	State University of New York	20070330
60	CN101244267	Immune preparation with .beta.-glucan oligosaccharide as immune adjuvant for improving immunogenicity of microbial vaccine	Fudan University	20070212
61	CN101057975	Cocktail vaccine for resisting immunotolerant and immunodeficient virus and its application	Chinese Academy of Sciences	20061213
62	WO2008150276	Nanoparticles coated with viral envelope proteins and derivatives and their therapeutic and diagnostic uses	University of Texas System	20060926
63	US20080063664	High-yield transgenic mammalian expression system for generating virus-like particles of coronavirus structural proteins for vaccines and diagnosis	Academia Sinica	20060905
64	US20080063664	High-yield transgenic mammalian expression system for generating virus-like particles and VLP comprising coronavirus structural proteins as vaccine and diagnostic for SARS	Academia Sinica	20060905
65	WO2008063245	Expression systems for use in Crustiferae for the manufacture of proteins for therapeutic and vaccine use	Thomas Jefferson University	20060711
66	WO2008060702	Replikin peptides correlated and predictive of replication, virulence, and host mortality of influenza viruses	USA	20060530
67	US20070253973	Fusion proteins comprising .alpha.-fetoprotein with therapeutic or immunological peptides for improved plasma stability	Cogenesys, Inc.	20060330
68	CN101020055	Preparation of SARS vaccine based on replicative vaccinia virus vector	Chinese Center for Disease Control and Prevention	20060216

69	WO2007091624	Baculovirus vectors expressing antigen-viral protein fusion protein under dual promoters for use in production of vaccines against influenza and malaria	Jichi Medical University; Otsuka Pharmaceutical Co., Ltd.	20060209
70	CN101007168	SARS vaccine, and its preparation method	Peking University	20060123
71	US20070166800	Vaccine composition comprising immunogen, polyinosinic acid-polycytidilic acid-based adjuvant, antibiotic and positive ion for inducing mucosal immune response against infection and cancer	Newbiomed Pika Pte Ltd	20060113
72	US20070166239	Mucosal immunogenic substances comprising a polyinosinic acid - polycytidylc acid based adjuvant	Newbiomed Pika Pte Ltd	20060113
73	US7951384	Virus-like particles as vaccines for paramyxovirus	University of Massachusetts	20050805
74	US7951384	Virus-like particles comprising Newcastle disease virus matrix, transmembrane and cytoplasmic proteins and Respiratory syncytial virus ectodomain protein as vaccines against paramyxoviral infection	University of Massachusetts	20050805
75	US20090068221	Virus-like particles comprising Newcastle disease virus matrix protein, transmembrane domain protein, cytoplasmic domain protein and protein of interest as vaccines against paramyxovirus	University of Massachusetts	20050805
76	US7951384	Virus-like particles comprising cytoplasmic and/or transmembrane domain of Newcastle disease virus protein and target antigen as vaccines against paramyxovirus infection	University of Massachusetts	20050805
77	US20070003577	Purified trimeric S (spike) protein as vaccine against severe acute respiratory syndrome virus infections	Hong Kong	20050628
78	EP1736539	Attenuated SARS and use thereof as a nucleic acid vaccine	Consejo Superior de Investigaciones Cientificas (CSIC)	20050624
79	CN1884303	Fusion proteins of recombinant SARS coronavirus structural proteins, their production and antiviral uses thereof	Chinese Academy of Medical Sciences	20050620
80	CN1990042	Lymphocyte vaccines expressing SARS coronavirus spike protein or fragments and its application	Third Military Medical University	20050531
81	CN1752099	Sequences of three novel SAR-S antigens uses in vaccination, diagnosis and treatment of Severe acute respiratory syndrome (SARS)	Sun Yat-Sen University	20050520
82	WO2006113429	Antigenic formulation of a viral protein or peptide that inhibits viral infection	XC Research, Inc.	20050413
83	CN1686563	Method for manufacturing attenuated Salmonella typhi vaccine carrying N gene of SARS virus on chromosome	Wuhan University	20050330

84	CN1840188	A recombinant SARS-CoV vaccine comprising attenuated vaccinia virus carriers	Chinese Academy of Medical Sciences; Aaron Diamond AIDS Research Center	20050127
85	WO2006071896	Epitope-based SARS vaccine	Hong Kong University of Science & Technology	20041223
86	US20060128628	HLA-A2-binding peptides of SARS virus spike protein	Taiwan	20041215
87	WO2006056103	An expression vector encoding coronavirus-like particles for cloning Class I viral fusion protein gene and the use of DNA vaccine	DNA Shuttle Biopharm Co., Ltd.	20041126
88	CN1775287	Manufacture of bivalent vaccine against influenza and severe acute respiratory syndrome	Sinovac Biotech Co., Ltd.	20041116
89	JP4665122	Recombinant vaccinia virus expressing SARS coronavirus structural protein and uses as vaccine for preventing SARS infection	Tokyo Metropolitan Organization for Medical Research; Chemo-Sero-Therapeutic Research Institute; University of Tokyo; Nagasaki University; Natl. Inst. Health Japan; Nitto Sangyo Y. K.	20041008
90	WO2006042156	Improving and stabilizing the attenuation of vaccine strains of microorganism by altering the codon usage of essential genes	U.S. Department of Health and Human Services	20041008
91	JP4665122	Recombinant vaccinia virus expressing SARS coronavirus structural protein and uses as vaccine for preventing SARS infection	Post Genome Institute Co., Ltd.; Chemo-Sero-Therapeutic Research Institute	20041008
92	US20060093616	Vaccination of eucaryotic hosts for protection against SARS-coronavirus (SARS-CoV) infection	Hong Kong	20040929
93	US20060057161	Methods for detection of SARS coronavirus envelope, membrane, nucleocapsid and spike proteins and their encoding genes by immunodiagnosis and RT-PCR and vaccines for prophylaxis	Academia Sinica	20040916
94	CN1616110	Hybrid recombinant yeast vaccine containing epitope gene of SARS virus and its preparation method	Peop. Rep. China	20040910
95	CN1746181	T-cell antigen determinants of SARS coronavirus and their applications as therapeutic agents	Chinese Academy of Medical Sciences	20040908
96	CN1746183	B-cell antigens for SARS Coronavirus and uses for diagnosis, therapy and vaccination.	Chinese Academy of Medical Sciences	20040906

97	EP1632564	Vaccine against SARS coronavirus	Consejo Superior de Investigaciones Cientificas (CSIC)	20040903
98	WO2006022215	Constructing vaccinia virus DIs expressing SARS-coronavirus structural proteins and its use for treatment of SARS	Japan Health Sciences Foundation	20040823
99	SG119380	Proteins encoded by the severe acute respiratory syndrome (SARS) coronavirus and a role in apoptosis	Agency for Science, Technology & Research	20040804
100	TWI293957	SARS coronavirus E2 fusion proteins for therapy	Healthbanks Biotech Co., Ltd.	20040721
101	WO2006068663	Vaccine compositions comprising adjuvant and proteins S, N and/or M for preventing and treating coronavirus infection	ID Biomedical Corp.	20040630
102	WO2005122739	Adjuvancy and immune potentiating properties of the activation-associated secreted protein of Onchocerca volvulus	New York Blood Center, Inc.	20040615
103	US20060188519	Peptides, antibodies, and methods for the diagnosis of SARS	Hong Kong	20040614
104	WO2005118813	Expression of SARS corona virus spike protein and the use of protein for preparation of vaccine	Institut Pasteur; Hong Kong Pasteur Research Centre Limited	20040604
105	WO2005117961	SARS vaccine comprising adenoviral vector encoding SARS virus S gene	Sun Yat-Sen University	20040604
106	WO2005117960	SARS DNA vaccine comprising adenoviral vector encoding full length S gene and method of preparation	Sun Yat-Sen University	20040604
107	WO2005120565	SARS coronavirus spike protein peptides and fusion protein with IgG Fc fragments as vaccines and for producing highly potent antibodies	New York Blood Center, Inc.	20040602
108	US20060039926	Live attenuated coronavirus or torovirus with substitution mutagenesis on ExoN or Orf2a protein-encoding gene for use as vaccines	Vanderbilt University	20040521
109	CN1608673	Antigen S190 derived from SARS coronavirus protein S and use as vaccines	Nanjing University	20040520
110	WO2005103259	Sequences of SARS coronavirus nucleocapsid protein epitopes and uses in diagnosis and antiviral therapy	University Health Network; Beckman Coulter, Inc.; Universite De Montreal; National Health Research Institutes	20040426
111	WO2006071250	Neutralizing antibody and protective immunity to SARS coronavirus infection of mice induced by a soluble recombinant polypeptide containing an N-terminal segment of the spike glycoprotein	U.S. Department of Health and Human Services	20040405

112	EP1584628	Protein and nucleic acid sequence of SARS CoV protein 3a and its therapeutic uses	Yung Shin Pharmaceutical Industrial Co., Ltd.	20040302
113	JP2005270102	SARS coronavirus protein 3a and its immunogenic fragments for use in diagnosis, therapy, and drug screening	Yung Shin Pharmaceutical Industrial Co., Ltd.	20040302
114	CN1657102	Antigen sequences derived from SARS coronavirus spike protein and M protein for making vaccines	Fudan University	20040220
115	US20080213284	Receptor binding peptides of the S protein of SARS coronavirus as antigens and drug targets	National Health Research Institutes	20040109
116	CN1631896	Recombinant protein	Peking University	20031223
117	WO2005056585	SARS coronavirus S (spike) proteins, uses thereof in detection of SARS infection, and for treatment	Agency for Science, Technology & Research	20031210
118	FR2862981	The genome and gene products of a Vietnamese isolate of SARS coronavirus and use of the proteins in vaccines	Institut Pasteur; Centre National de la Recherche Scientifique	20031202
119	FR2862974	The genome and gene products of a Vietnamese isolate of SARS coronavirus and use of the proteins in vaccines	Institut Pasteur; Centre National de la Recherche Scientifique	20031202
120	CN1580073	Protein and DNA sequences of the epitopes of SARS coronavirus membrane protein, and their applications in diagnosis and preparation of vaccine	Shenzhen University	20031128
121	WO2005060520	Antibodies specific to SARS-CoV spike protein for diagnosis and therapy of SARS and for screening of epitopic vaccines or anti-SARS therapeutics	Dana-Farber Cancer Institute, Inc.	20031125
122	WO2005081716	DNA vaccines encoding human calreticulin for targeting antigens of severe acute respiratory syndrome coronavirus or SARS-CoV	Johns Hopkins University	20031124
123	CN1618802	Preparation of SARS antigen peptide-binding tetramer and its uses for preparing vaccine	Chinese Academy of Sciences	20031121
124	CN1616654	Methods for inactivating SARS virus and purifying inactivated SARS virus, and vaccine containing the same and its preparation method	Sinovac Biotech Co., Ltd.	20031112
125	CN1613870	Preparation of SARS virus antigen peptide binding tetramer and its uses for preparing vaccine	Chinese Academy of Sciences	20031106
126	CN1603346	Cloning and application of S protein fragments of SARS coronavirus for diagnosis, treatment and/or prevention of SARS associated diseases	Xiamen University; Yangshengtang Co., Ltd.	20030929

127	US20050112559	Compositions and methods for diagnosing and preventing severe acute respiratory syndrome (SARS) targeted to SARS CoV nucleocapsid protein and the spike glycoprotein	Chinese University of Hong Kong	20030929
128	CN1600791	Sequences of SARS coronavirus antigen peptides derived from spike protein and use for vaccination	Peking University	20030926
129	CN1597964	Expression and purification of recombinant sars coronavirus m protein	Chinese Academy of Sciences	20030917
130	WO2005027963	Methods and compositions for the generation of a protective immune response against Sars-cov	National Institutes of Health (USA)	20030915
131	US20050113298	Sequences of the receptor binding peptides derived from the SARS S protein	Brigham and Women's Hospital	20030915
132	US20050069950	Self-assembled layered films of antigens and polyelectrolytes for use in vaccines	Artificial Cell Technologies, Inc.	20030829
133	WO2005019246	Epitopes of SARS coronavirus: vaccines, therapeutics and diagnostics	Exploit Technologies Pte. Ltd.; Ip Organisers Pty. Ltd.	20030821
134	CN1580072	Highly immunogenic fragments of the spike protein (s protein) of SARS coronavirus, its coding sequence and use as antiviral vaccine	Tsinghua University; Institute of Biophysics, Chinese Academy of Sciences	20030815
135	WO2005013904	Codon-optimized SARS virus nucleic acids encoding antigenic proteins and uses as vaccines	University of Massachusetts	20030804
136	US20050095618	Sequences of spike protein fragments for diagnosing and treating severe acute respiratory syndrome (SARS)	Chinese University of Hong Kong	20030729
137	WO2005010034	Soluble fragments of the spike glycoprotein of SARS coronavirus for prophylactic and therapeutic use	U.S. Department of Health and Human Services	20030721
138	WO2005035712	Infectious recombinant SARS coronavirus vectors and RNA replicons, and methods for production and use as immunogens, vaccines, or to express heterologous nucleic acids	University of North Carolina	20030721
139	WO2005012338	Antigenic peptides of SARS coronavirus and uses thereof	Crucell Holland BV	20030721
140	WO2005010034	SARS coronavirus spike glycoprotein and fragments, polynucleotides encoding them and antibodies for diagnosis and treatment of SARS	National Institutes of Health (USA)	20030721
141	CN1570101	Preparation of SARS coronavirus optimized N protein optimized and the use of the protein as vaccine	Peop. Rep. China	20030716
142	CN1570115	Preparation of SARS coronavirus optimized S protein and the use of the protein as vaccine	Peop. Rep. China	20030716

143	WO2009012489	Avian influenza virus chimeric virus-like particles (VLPs) comprising avian influenza M1 and non-avian influenza viral antigen, and vaccine uses thereof	Novavax, Inc.	20030711
144	CN1566335	Method for large scale preparation and inactivation of SARS virus for inactivated vaccine production	Sinovac Biotech Co., Ltd.	20030710
145	CN1566334	A new reovirus, its antibody and vaccine, and their application	Academy of Military Medical Sciences	20030708
146	CN1480215	SARS coronavirus-specific antigen/antibody composite vaccine, experimental animal model and method	Peop. Rep. China	20030707
147	CN1566144	Functional protein of SARS coronavirus	Academy of Military Medical Sciences	20030702
148	CN1566143	SARS coronavirus nucleocapsid protein and antigenic epitopes as vaccines and to generate antibodies for diagnosis and treatment of SARS	Shanghai Institute for Biological Sciences, Chinese Academy of Sciences; Shanghai Center for Bioinformation Technology	20030625
149	WO2005016247	DNA sequences, peptides, antibodies and vaccines for prevention and treatment of SARS	Protein Potential LLC	20030624
150	WO2005021713	Compositions containing vectors expressing SARS coronavirus S, M, E or N proteins for diagnosis and treatment of SARS	Sanofi-Aventis	20030620
151	WO2005001096	Vaccines against SARS (Severe Acute Respiratory Syndrome)	Bio-Pharm Science & Technology Co., Ltd.	20030617
152	CN1572328	Genetic anti-SARS virus vaccine, its preparation and method for use thereof	Chinese Academy of Sciences	20030616
153	CN1572323	Genetic vaccine of anti-SARS virus and its construction and application	Chinese Academy of Sciences	20030616
154	CN1566342	diagnosis and treatment of SARS coronavirus infection with spike protein peptides and corresponding polynucleotides	Academy of Military Medical Sciences	20030616
155	CN1566158	Recombinant vaccines comprising chimeric proteins of SARS virus S protein and auxiliary peptides for preventing and treating SARS	Jiangsu Weilan Bioengineering Co., Ltd.; American Gene Gate Biotechnology Corporation	20030613
156	CN1472321	Synthetic S gene fragment of SARS coronavirus, its expression and application in preparing vaccine	Peop. Rep. China	20030613

157	CN1475571	Recombinant expression of SARS coronavirus genes in Hansenula polymorpha and uses in vaccination against SARS	Chinese Academy of Sciences	20030612
158	WO2004108756	SARS coronavirus peptides for use in immunodiagnosis or vaccines	Pegasus Pharmaceuticals Group Inc.	20030609
159	US20050025788	Systemic delivery of non-viral vector expressing SARS viral genomic vaccine	Taiwan	20030606
160	CN1552851	Pseudo-SARS coronavirus for drug screening	Beijing Univ.	20030606
161	WO2005018538	Sequences of antigenic determinant peptides of severe acute respiratory syndrome (SARS) virus, and the use in diagnostic, vaccination and therapeutic applications	Vaxim, Inc.	20030604
162	CN1449831	Preparation of anti-SARS coronavirus DNA vaccine pVPS2	Second Military Medical University	20030603
163	CN1449830	Modified SARS coronavirus S protein gene as DNA vaccine pVFS for preventing SARS	Second Military Medical University	20030603
164	CN1449829	DNA vaccine carrying SARS coronavirus S protein antigen determinant and tissue plasminogen activator genes for preventing SARS	Second Military Medical University	20030603
165	CN1449828	Cloning and application of DNA vaccine pVPM against SARS	Second Military Medical University	20030603
166	CN1449827	DNA vaccine pVPH expressing human coronavirus hemagglutinin esterase antigen determinant for preventing SARS	Second Military Medical University	20030603
167	WO2004110483	DNA vaccines encoding chimeric proteins derived from SARS-coronavirus genes for preventing and treating SARS virus infection	USA	20030531
168	CN1552731	Use and clone expression of SARS coronavirus protein N for diagnosis and therapy	Academy of Military Medical Sciences	20030530
169	US20050282279	Expression vector encoding a coronavirus-like particle for cloning the Class I viral fusion protein gene, and DNA vaccine uses	Dnashuttle Biopharm Co., Ltd.	20030529
170	CN1449826	Sequence of SARS coronavirus spike protein gene and use as viral vaccine	Wuhan University	20030527
171	CN1562366	Vector pcDNA3 encoding SARS coronavirus S gene as vaccine against SARS	Zhongshan Tumour Prevention & Treatment Center; Sun Yat-Sen University	20030521
172	CN1562365	SARS vaccine comprising adenoviral vector encoding coronavirus S gene for mucosal or injection administration	Sun Yat-Sen University	20030521
173	US8080642	Severe acute respiratory syndrome DNA vaccines specific for SARS coronavirus proteins	Vical Inc.	20030516

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175	CN1548452	Protein and cDNA sequences of a novel SARS coronavirus protein SCM (SARS membrane protein) and therapeutic use	Tsinghua University	20030508
176	WO2005016238	A method of generating SARS virus neutralizing antibodies using epitopes of spike and nucleocapsid proteins and uses in diagnosis and therapy	Duke University	20030508
177	US20050002953	Preparation of SARS coronavirus virus-like particles expressing E-protein, M-protein and S-protein and use for inducing antiviral immune responses	Germany	20030506
178	WO2005032453	Vaccines containing spike protein HR1/HR2 peptide conjugates blocking fusion of SARS coronavirus to target cell and its use in prevention and treatment of infection	Sequoia Pharmaceuticals, Inc.	20030428
179	WO2004091524	Respiratory virus vaccines comprising spike protein and nucleoprotein of SARS or human coronavirus	Acambis PLC	20030414
180	WO2004092360	Genome and protein sequences of severe acute respiratory syndrome coronavirus and their use in preparation and manufacture of vaccine formulations and diagnostic reagents	Novartis AG	20030410
181	WO2004092360	Genome and protein sequences of severe acute respiratory syndrome coronavirus and their use in preparation and manufacture of vaccine formulations and diagnostic reagents	Novartis AG	20030410
182	WO2004092360	Genome and protein sequences of severe acute respiratory syndrome coronavirus and their use in preparation and manufacture of vaccine formulations and diagnostic reagents	Novartis AG	20030410
183	EP1466922	Sequences of SARS coronavirus and diagnostic and therapeutic use	Vironovative B.V.	20030408
184	WO2004085633	A novel human virus causing severe acute respiratory syndrome (SARS) and uses thereof in vaccination and diagnosis	University of Hong Kong	20030324
185	US7442761	Identification, isolation and therapeutic and diagnostic uses of replikins, peptides related to rapid cell replication and high human mortality	USA	20010327
186	WO2001045718	Delipidated SARS vaccine	Lipid Sciences, Inc.	19991223
187	WO2001045718	Vaccine compositions comprising delipidated viral particles with immunogenic properties and reduced infectivity for preventing and treating infectious diseases	Lipid Sciences, Inc.	19991223

188	US20020151677	Methods for identifying replikin scaffold peptides in virus or organism as vaccines and for diagnosing, preventing and treating diseases	Can.	19940217
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